How do I select a science fair topic?

Sometimes one of the hardest things about a science fair project is selecting a topic! Here are a few things to keep in mind when you are selecting your topic:

- Pick something you are interested in
- Ask family members what they think you should do
- Think of something that you already know a little about
- Think about what types of materials you already have at your home

If you still can't think of something to do, check out some of the web sites listed below. Students are allowed to choose any topic that they would like as long as it follows these rules:

- **All projects must follow the scientific method and test a hypothesis. No displays or demonstration projects; for example, no volcanoes.**
- **Students may either work by themselves, or with one other student from the same grade level.**
- **Grades K-2 can do a class project.**
- **A student's project should reflect his/her age and ability level.**
- **All experiments must be supervised by an adult.**
- **Glass, flames, live animals, and hazardous chemicals will not be allowed as part of a student's display.**

Once you have selected a topic for your project, please complete the application form with your family, and return it to your teacher. Then you may begin working on your project. **All applications are due to your teacher by January 20, 2006.**

Where do I look to find a topic?

Science Buddies
http://www.sciencebuddies.org/mentoring/science-fairs.shtml

Science Fair Topics
www.accessexcellence.org/RC/scifair.html

School Discovery
http://www.school.discovery.com/science fair central/

All Science Fair Projects
http://www.all-science-fair-projects.com

The Ultimate Science Fair Resource
http://www.scifair.org

Books with science fair topics

Below is a list of books that can help you select a topic and frame your project. Some books are subject specific and others are more grade specific. All elementary school libraries in the Sumner School District have at least one science fair book. If you find one that doesn't, please contact the science fair committee. All of these books can be found at local bookstores, and most can be found at public libraries.

700 Science Experiments for Everyone, Doubleday, 1958,*
ISBN 0-385-05275-8

Great Science Fair Projects, Scientific America, Marc Rosner, 2000,
ISBN 0-471-35625-5

Science Fair Projects for Dummies, Maxine Levaren, Wiley Publishers, 2003,
ISBN 0-7645-5460-3

Sure to Win Science Fair Projects, Joe Rhatigan, Lark Books Publisher, 2002,
ISBN 1-57990-238-3

Hands-On Science, King Fisher Publisher, 2001,
ISBN 0-7534-5440-8

The Science of Life, Projects and Principles for Beginning Biologist,
Frank G. Bottone Jr., 2001, Chicago Review Press,
ISBN 1-55652-382-3

The Complete handbook of Science Fair Projects, Revised edition,
Julianne Blair Bochinski, 1996, Wiley and Sons Publishers,
ISBN 0-471-12378-1

Electron Herding 101, 50 Hands-on Science Experiments That Explore Electricity,
B.K. Hixson, 2002, Loose in the Lab, Inc. Publisher

Science in Seconds for Kids, Over 100 science experiments you can do in ten minutes.
Jean Potter, Wiley and sons publisher, 1995,
ISBN 0-471-04456-3

Mad Professor – Concoct Extremely Weird Science Projects,
Mark Frauenfelder, Chronicle Books, 2002, ISBN 0-8118-3554-5

Strategies for Winning Science Fair Projects, Joyce Henderson and
Heather Tomasello, Wiley and Sons, 2002,
ISBN 0-471-41957-5

* This is a 1950's golden oldie. We like how it demonstrates building science equipment using regular household items.

How do I make a science fair project?

All projects must follow each step of the grade level appropriate scientific method. See "What goes in each section of my science fair project" for K-2, 3-5, and 6-12 for details. Below is a step-by-step description of the scientific method for grades 6-12 and what students need to do for each part. All projects will need to be displayed on a presentation board (suggested size 48"x 36"). These boards can be purchased at an office supply store, or large pieces of cardboard also work well. Each 6-12 grade student's presentation board should have seven sections and follow this format:

<table>
<tr><td rowspan="2">Section #1
Question / Problem Statement</td><td colspan="2">(Project Title)</td><td rowspan="2">Section #4
Variables</td></tr>
<tr><td>Section #2
Prediction / Hypothesis</td><td>Section #3
Resources</td></tr>
<tr><td>Section #5
Materials / Procedures</td><td colspan="2">Section #6
Data / Analysis</td><td>Section #7
Conclusion / Summary</td></tr>
</table>

(Side #1) (Middle Section) (Side #2)

- **The project must have a title, and each section must also have a title.**
- **The spacing demonstrated here is only a suggestion. The size of each section may vary; however, their order and location must be as shown above.**
- **Your name, teacher's name, and school name should be located <u>ON THE BACK</u> of your board.**

What goes in each section of my science fair project? (6^{th}–12^{th} Section)

Section One: Question / Problem Statement

What is the Question / Problem Statement?
The first section of the scientific method is the Question / Problem Statement. It is the question that you are trying to answer with your project, the reason for doing the experiment.

For example: "Which type of bread will grow mold the fastest?"

What must be included in this section?
This section only needs to be one sentence long, but it must be in the form of a question.

Tips:
Make sure that your Problem Statement is only going to be testing one thing. For example, you would not want to be testing which type of bread will grow mold the fastest and which type will grow mold the slowest. That would be doing two experiments in one and could confuse your results.

Don't forget to title this section "Question / Problem Statement".

Section Two: Prediction/Hypothesis

What is the Prediction/Hypothesis?
The second section of the scientific method is the Prediction/Hypothesis. It is a guess of what you think will happen when you do your experiment, and it should be written as a cause and effect statement. You can include your labeled variables in your prediction. You need to include why you think what you do.

For example, "If a plant gets more light (manipulated variable), then it will grow taller (responding variable) because plants need light to grow.

What must be included in this section?
This section only needs to be one sentence long, but it must be a cause and effect statement.

Tips:
Make sure that your hypothesis only predicts one outcome. Then, you will clearly know whether your hypothesis is right or not. Your hypotheses can be two sentences. The first is If...(manipulated variable), then...(responding variable) and the second sentence is why you think what you do.

For example, if you are testing different types of bread and your hypothesis says that sourdough bread will grow mold the fastest and wheat bread will grow mold the slowest, you will have a problem if one part comes true and the other doesn't. When you get to the last section of the scientific method, you will not know whether to accept or reject your hypothesis.

Don't forget to title this section "Prediction / Hypothesis".

Section Three: Resources

What is this section called Resources?
The third section of the scientific method is the Resources. This is where you gather background information on your topic and the materials that you are going to use. You will then use this background information to gain a better understanding of the science behind your project.

What must be included in this section?
This section must have a list of resources from which you obtained the background information on your project. It will look like a bibliography.

Tips:
For example, if your project uses plants, you would want to do some reading on photosynthesis and possibly the exchange of gases. Make sure to list all resources that you used for background knowledge. If you gained information from a person, you must list that as an interview, citing the date and time of the conversation, as well as the person's expertise on your topic. For example, an exterminator would be a credible person to interview regarding the behavior of insects.

Don't forget to title this section "Resources".

Section Four: Variables

What are Variables?
The fourth section of the scientific method is the Variables. This is where you list the things that will remain the same and the things that will be different during the experiment.

What must be included in this section?
This section must have three types of variables listed: 1) You must list the Controlled Variables. This is what you will make sure to keep the same. For example, if you are testing the effect of music on plant growth, your controlled variables would be the amount of sunlight, water, and temperature of the plants. You will want to keep all of these things the same so that the only difference between the plants is what you are testing for. 2) You must also list the Manipulated Variable. This is what you are changing to do the experiment. When testing the effect of music on plant growth, the manipulated variable would be the type of music played to each plant. 3) You must also list the Responding Variable. This is what you are measuring. It is the response to the manipulated variable. In the plant experiment, the responding variable would be the amount growth for each plant.

Tips:
This section should look something like this:

Controlled Variables	=	sunlight, water, temperature, location of plants, length of time exposed to music
Manipulated Variable	=	type of music played to plants
Responding Variable	=	amount that each plant has grown

Don't forget to title this section "Variables".

Section Five: Materials / Procedure

What is the Materials / Procedure?
The fifth section of the scientific method is the Materials / Procedure. This is where you outline exactly what you are going to be doing to see if your hypothesis is correct.

What must be included in this section?
This section must include two parts: (1) a list of all materials needed to conduct your experiment and (2) a step-by-step procedure that you will follow to conduct your experiment. A list of all safety concerns surrounding this experiment should be recorded in your journal.

Tips:
Make sure that your step-by-step procedure is detailed enough so that anyone could gather the materials from your list, follow your procedure, and get the same results that you did. Also, there are always safety concerns when conducting experiments. Make sure not to leave these out!

Don't forget to title this section "Materials / Procedure".

Now that you have completed sections 1-5, it is time to do your experiment. Make sure that you have your family's permission before conducting any type of science experiment!

Section Six: Data / Analysis

What is the Data / Analysis?
The sixth section of the scientific method is the Data / Analysis. This is the record of what actually happened during the experiment. It is the results of the experiment.

What must be included in this section?
This section must include three parts: (1) a graph or chart that displays your data, (2) pictures or drawings of your experiment as it happened, and (3) a few paragraphs that explain what happened during your experiment.

Tips:
Make sure that your chart or graph is colorful and can easily be understood. It should paint a clear picture of exactly what happened. Also make sure that your paragraphs have been proofread and do not contain any spelling or grammar errors.

Don't forget to title this section "Data / Analysis".

Section Seven: Conclusion / Summary

What is the Conclusion / Summary?
This is the last section of the scientific method. The Conclusion is where you decide if you will accept or reject your hypothesis, and explain what you have learned.

What must be included in this section?
This section must include two parts: (1) a complete sentence claiming whether you accept or reject your hypothesis and (2) a few paragraphs that explain what you have learned, how other people can learn from your experiment, and how others can put your results to work in real situations.

Tips:
To decide whether you should accept or reject your hypothesis, you will need to compare it to your Data / Analysis section. If what you thought was going to happen really did happen, you should write: "I accept my hypothesis", however, if what you thought would happen did not really happen, you should write: "I reject my hypothesis".

Many more scientists end up rejecting their hypothesis than accepting it; so don't feel bad if you end up rejecting yours. Whether you accept or reject your hypothesis will have absolutely no effect on the judging.

Don't forget to title this section "Conclusion / Summary".